In a similar way we can show that, v is $= kh_m$ for sinusoidal modulation, $\frac{161}{165}(kh_m)$ for half square-wave modulation and $\frac{80.5}{165}(kh_m)$ for saw-tooth type of modulation. Thus we find that we get the strongest signal if we use a full square-wave modulation.

It is enough to consider the first four or five terms in (4) because the different types of modulation that we are thinking of happen to be represented by fairly fast converging Fourier series. But care must be taken to see, while employing square-wave modulation, that ω is small so that 5ω is not large enough to affect the steady state assumptions made in the theory.

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Vibrational spectra of o- and m-methylstyrenes

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Styrene is one of the important organic compounds which has attracted the attention of a large number of workers The infrared, Raman and electronic spectra of styrene have been studied thoroughly by Stair & Colbelt (1935), Williams (1936) and Pitzer *et al* (1946). The infrared absorption spectra of its halogenated derivatives and electronic absorption spectra of the three isomeric methylstyrenes have been studied by Ansari (1968). But in the case of its methyl substituent, no work on infrared and Raman spectra has been reported so far. The present note deals with the infrared spectra of *o*- and *m*-methylstyrenes.

The compounds of L.R. grade quality were supplied by Koch-Light Laboratories, U.K. The infrared traces of the compounds were recorded in the liquid phase on a 13U Perkin Elmer double beam infrared spectrophotometer equipped with NaCl prism using a cell of thickness 0.05 mm.

Both the molecules belong to the C_s symmetry with the molecular plane as the only symmetry element when we assume the vinyl and methyl groups behaving as a single atom. The 51 normal modes of vibrations are divided as 35 a' (planar) and 16a'' (non-planar). All the vibrations are allowed in infrared and Raman spectra.

In making the assignments, assistance has been taken from comparison with the assignments of benzene by Herzberg (1945), styrene by Stair & Colbelt (1935), isomeric bromostyrenes by Ansari (1968), isomeric methylanilines by Verma (1967) and β-bromostyrene by Singh & Singh (1968) The assignments of observed bands with visual estimates of the relative intensity is presented in table 1.

Table 1. Fundamental vibrational frequencies and their assignments for *o*- & *m*-methylstyrenes

o-methylstyrene (cm^{-1})	*m*-methylstyrene (cm^{-1})	Species (C_s)	Assignments
720 (10)	687 (9)	a''	C-C-C bending o.p.
770 (10)	790 (10)	a'	C-CH_3 stretching
867 (1)	883 (4)	a''	C-H bending o.p.
913 (8)	902 (9)	a''	= CH_2 bending o.p.
991 (7)	990 (8)	a''	C-H bending o.p.
1028 (3)	1033 (2)	a'	C-C ring breathing
1057 (2)	1043 (3)	a'	CH_3 rocking
1108 (3)	1095 (3)	a'	C-H bending i.p.
1164 (2)	1159 (3)	a'	C-H bending i.p.
1185 (2)	1168 (3)	a'	C-H bending i.p.
1222 (2)	1194 (1)	a'	C-CH = CH_2 stretching
1280 (2)	1280 (3)	a'	= CH bending i.p. (group-CH = CH_2)
1310 (1)	1310 (1)	a'	C-C stretching
1390 (4)	1383 (3)	a'	C-H sym. bending in methyl group.
1418 (5)	1418 (3)	a'	= CH_2 beinding i.p. (group-CH = CH_2)
1461 (7)	1448 (4)	a'	C-H asym. bending in methyl group
1487 (8)	1487 (5)	a'	C-C stretching
1562 (1)	1575 (5)	a'	C-C stretching
1590 (1)	1592 (5)	a'	C-C stretching
1624 (7)	1625 (3)	a'	C = C stretching (group-CH = CH_2)
2872 (sh)	2870 (sh)	a'	C-H sym. stretching in methyl group.
2970 (7)	2952 (5)	a'	C-H asym. stretching in methyl group.
3050 (8)	3032 (6)	a'	= CH stretching (group-C H = CH_2)

N.B :—The corresponding intensity is given in the parenthesis.
o.p. = out-of-plane; i.p. = in-plane; sh = shoulder; sym. = symmetric and asym. = asymmetric.

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A preliminary report on the structure of glycocyamine hemihydrate, diglycine monopicrate and 4-(N-phenyl piperizino)-6-methoxy quinaldine

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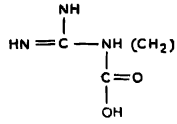
The crystal structure determination of several biologically important compounds has been undertaken in this laboratory in order to explain their functions in relation to structure. A preliminary report on the structural study of three of them is presented here.

1. *Glycocyamine hemihydrate*

Glycocyamine or guanidoacetic acid having the chemical formula



is an important amino acid. The colourless crystal grows as elongated prism on slow evaporation of an aqueous solution of the compound at room temperature.

Rotation and Weissenberg X-ray photographs show that the crystal belongs to the monoclinic system with $a = 5.09$Å, $b = 6.16$Å, $c = 17.47$Å and $\beta = 95.2°$.